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Soil Conservation

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SOIL CONSERVATION

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OUR SOIL * OUR STRENGTH

★ THIS MONTH ★

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TOM DALE, Editor

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WILTED GRASS SILAGE.—Researchers at the University of Wisconsin have found that wilting the crop before putting it in the silo cuts losses and improves the quality and palatability of grass silage.

For 2 years they filled 2 silos with the same forage cut at the same time. The forage in 1 was wilted by leaving it in the field for 2 or 3 hours after cutting. The other forage went right into the silo from the chopper. In both years the wilted silage was better in all respects.

Seepage losses were high with the direct-cut silage, which had around 85 percent moisture when cut. Up to 40 percent of the weight put into the silo ran out, and with it went 10 percent of the dry matter ensiled.

Wilting cut the dry matter losses way down and also cut fermentation losses.

The wilted silage was consistently better in feeding trials. It was more acid and did not have the objectionable odor of high moisture silage. Cows ate as much as 25 percent more dry matter as wilted silage than as direct-cut silage.

Editors are invited to reprint material originating in this magazine.



FRONT COVER.—A shelterbelt planting provides cover for pheasants on the Lester Wolfe farm near Uniontown, Wash.

All orders go to the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

Note:—
Service,

A Guiding Hand

A Kentucky Farmer Supervises an Orphanage and a Soil Conservation District, Thus Helping Conserve Both Human and Soil Resources

By KENT ALVERSON

"WHEN you can't have the best, make better use of what you have," says L. W. Murdock, Kentucky farmer. He teaches that philosophy to more than 20 orphan children who work and play under his supervision at Paradise Friendly Home, 15 miles southeast of Mayfield, Ky.

The same idea prompted an experiment in forestry, a few miles away, that has brightened the outlook for several thousand acres of poorer land in Graves County.

To see the connection between the two, you must know that Murdock, in addition to being a farmer and godfather to some less fortunate children, is also the chairman of the Graves County Soil Conservation District board.

Graves County, in western Kentucky, had been doing a lot about its conservation problems under Murdock's leadership the past 12 years. But one of its most vexing problems had gone unsolved. That was the question of what to do with 20,000 acres of land now covered with poor quality, scrub growth, hardwood timber.

In the main, this land is low value Brandon silt loam—extremely drouthy—with sand near the surface. Native trees grow so slowly that, according to research men, annual production ranges from zero to only 50 board feet of lumber per acre. In some places the trees don't even provide good ground cover. Yet, foresters contend that, when planted to some kinds of pine, this type of soil will produce 200 to 300 board feet of good quality lumber.

Recognizing this problem and the solution for it, the soil conservation district supervisors decided they should set up some observational areas and show people of the community what could be done.

Here was "orphan" land—neglected, abused, unused—because few people recognized its po-

tential. Soil resources wasted for want of a guiding hand!

Though Murdock probably didn't think of this comparison, his orphanage is also a test plot. Children are taken in from the poorest of backgrounds—out of tune with the world, and not knowing whence they came nor where they are going. Their talents are analyzed and they are directed toward the things they can do best.

They are taught to take an active interest in their community—the 4-H clubs and FFA, how to get along in society and make an honest living. And because of Murdock's keen interest—how to maintain the fertility of our soils.

No, Murdock was not making comparisons—but he was thinking of both his "children" and the land. Here was a chance to do something for the community and for his orphans at the same time.

"How about having my boys and girls lend a hand with the project?" he asked at the district's board meeting.

There were a lot of details to be worked out—where to get the trees, what would be the best place for a demonstration planting, and how to get rid of the old brush and scrubby growth.

In the end, the supervisors picked out one of the worst areas for the growth of hardwoods in the community—on a farm just a short way from Paradise Friendly Home. Average size of the standing trees was only 8 to 10 inches in diameter after 40 years of growth.

A 3-acre piece was chosen—along the road where it would be readily seen. With the help and cooperation of the Kentucky Division of Forestry, a complete reforestation job was done. As Warren Holt, Soil Conservation Service technician at Mayfield, described it, "We went in there and girdled and chemically treated every tree we found with the exception of the red cedar and a few good quality white oaks. Everything else was killed off."

Note:—The author is information specialist, Soil Conservation Service, Milwaukee, Wis.

Then the "Friendly Home" crew went to work. "It was a year ago—in March," said Murdock. "The 12 older boys and I went in and did the actual planting. We spent about a day, planting by hand with spades, mattocks, and planting bars. We set out 3,000 trees—all loblolly and shortleaf pine. The State foresters called it a conversion planting from hardwoods to pine."

A lot more could be said of Murdock's efforts to bring a better tomorrow to the folks around him. Among other things, he has shown a great deal of enthusiasm for the new Obion Creek watershed program which involves a part of Graves County. This program is expected to increase yields and incomes on nearly 2,000 farms in western Kentucky and boost the standard of living for the whole area.

Murdock is a director of the Obion conservancy district. At a recent meeting he spoke of the urgency of getting farm planning and land treatment done in the subwatersheds. "If we as individuals and groups of farmers are finished with our part of the work, we can expect quicker help from the Government."

But it is his efforts with orphans and the teaching of conservation methods by doing on the acres surrounding his Paradise Friendly Home for which he is best known.

"My wife and I have kept homeless children for 25 years—ever since we were married," said Murdock. "But we didn't start operating the orphanage until 3 years ago. We think it is cheaper to furnish homeless children a good place to live and teach them to be useful citizens than to leave them in our slums or to pay taxes to support them in our penal institutions."

Paradise Friendly Home is sponsored by the Bell City Church of Christ, Farmington, Ky. Murdock built the first dormitory and the church helped feed and clothe the 10 to 12 children first accepted. But there were too many others "knocking on the door", as he put it, and it was decided to build a new dormitory which could accommodate around 35. At present there are 24 children ranging in age from four to 18 years.

The policy is to take under-privileged children—either boys or girls—and get them into the public schools at Sedalia. In addition, the



L. W. Murdock and the Paradise Friendly Home bus.

boys are given Vocational Agriculture training and the girls Home Economics training on the Murdock farm.

Help with the venture has come from many sources. The main source of support, though, comes from regular contributions of individuals and various congregations of the Church of Christ.

Murdock hopes to have the program largely self-supporting in the longrun—"if we can get a farm bought." Already they are growing a large share of their own food. And the children took an active interest in construction of the second home. Timber was donated on various farms and the boys did a pretty good job of logging, cutting, and hauling.

Murdock says, "We grind our own flour and meal here. We use only whole wheat flour. We find we can control the health of the kids about 90 percent with a good diet.

"We milk two cows and raise some beef, chickens, and eggs. We grow lots of vegetables and have a big patch of strawberries. We do have to buy oranges, apples, and fruit juices, but with the canned goods that are donated, our grocery bill is very light. By raising our own food we have better health, save money, and teach the children all at the same time."

There is no lack of opportunity to teach conservation, Murdock finds. He owns 143 acres, including 75 acres of woodland; his mother has 89 acres for which he is responsible, and a neighbor, Neal Brooks, donates the use of 92 acres including bottomland which can be cultivated.

Recently the Vocational Agriculture instructor from Sedalia joined Murdock in his conservation courses. "We got the boys out on an adjoining farm where the land had become severely gullied and eroded," Murdock said. "We explained first what had happened and how gullied land would affect them even if they lived on Broadway in New York City. We told them no Nation can stand economically with a depleted soil, yet tons of soil had left the place where we were standing. The "Ag" teacher ended with an explanation of how it could be helped with trees and sericea."

Murdock was the first farmer in the county to use multiflora rose as a living fence. The original plants came from Missouri, but he now raises his own plants from seed. He has made a



L. W. Murdock and three of the boys from Paradise Friendly Home planting a pine tree.

planting each year for the past 5 years and now has about 2 miles of hedge established.

Under his supervision, his "boys" regularly carry on reforestation and wildlife-area improvement projects. On one farm they cooperated with the Kentucky Department of Fish and Wildlife to "bring back" quail, rabbits, and other forms of wildlife to a 400-acre area with wildlife plantings and seedings.

IN SOUTH-WEST AFRICA the term soil conservation means better veld management and veld utilisation. As soil erosion is, as yet, not a serious problem, soil conservation is not an expensive undertaking. On the contrary, soil conservation and the investment of capital in improvements which make conservation farming possible, are sound business policy. As the desired pasture crops or their seed are present in most cases, the composition of the veld can be restored to normal and its carrying capacity developed to a maximum merely by improved veld management.

—Veldtrust

IMPROVED AUSTRALIAN PASTURE.—A 10-acre pasture in New South Wales, Australia, was grazed by 28 to 41 head of dairy cows from 3 to 5 hours daily for 9 months. The pasture was in excellent condition at the end of the period and the cows were producing well. A mixture of clovers and phalaris was used in seeding the pasture.

CONTROL OF AQUATIC AND BANK WEEDS

By F. L. TIMMONS and D. L. KLINGMAN

No. 40

This is the fortieth of a series of articles to appear from time to time in explanation of the various phases of research being conducted by the Department of Agriculture on problems of soil and water conservation.

AQUATIC weeds which grow submerged in, floating on, or emergent from water are causing tremendous losses in irrigation and drainage canals, ponds, lakes, and marshlands. Closely related problems are weeds which grow at the waterline on ditch banks or on wet lands near marshes.

The demands for more water for irrigation, domestic and industrial uses, recreation, game and fish have made weed problems more acute and have made us aware of their growing importance. Along with the increasing awareness of the aquatic and bank weed problem has been the recent spectacular advances in herbicides, that has resulted in renewed hope that these weeds can be economically controlled and has stimulated increased research and action programs in that direction. Research has already developed a number of improved methods of control of aquatic and bank weeds, and there is reason to believe that many more problems can be solved through research.

Aquatic and bank weeds causes losses of at least eight types: (1) Sometimes aquatic weeds reduce the flow of water by as much as 97 percent. Reduced flow causes high water levels in canals and streams that result in flooding,

seepage into adjoining areas, breaks in canal banks, greater water losses from evaporation, and inadequate delivery of irrigation water to farms or inadequate drainage of water from farms. In addition, reduced velocity of flow causes increased sedimentation, making necessary more frequent mechanical cleaning. (2) Floating and other aquatic weeds that break loose obstruct weirs, gates, and other structures and often create flood hazards during storms. Also, algae and fragments of other submersed aquatic weeds clog sprinklers in sprinkler irrigation systems. (3) Aquatic and bank weeds provide breeding grounds for obnoxious insects, such as mosquitoes. (4) They prevent economic uses of farm ponds and reduce recreational values of lakes and ponds by interfering with



A dense growth of parrot's feather, cattail, tule, and saltcedar clogs this drainage canal in New Mexico.

Note:—The authors are research agronomists, crops research division, Agricultural Research Service, Laramie, Wyo. and Beltsville, Md., respectively.

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Bank growing narrow leaved cattail in a drainage canal of the Southwest.

fishing, swimming, boating, and hunting. (5) Aquatic weeds interfere with navigation of otherwise navigable streams. (6) The decaying organic matter produced by aquatic weeds cause objectionable odors and flavors, in potable water. (7) Emergent aquatic and bank weeds transpire tremendous quantities of water and cause serious losses in areas of water shortage. (8) Bank weeds prevent the proper inspection and maintenance of irrigation and drainage canals and shorelines of reservoirs.

Accurate figures are not available on the total monetary losses caused by aquatic and bank weeds or on the total costs of controlling these weeds in the United States. A few examples of such costs and of the extent of the problem, however, may indicate the economic importance of water and bank weeds. Annual losses from aquatic and bank weeds on the 130,000 miles of irrigation canals and laterals in 17 Western States totalled \$25.5 million according to a survey in 1947 and 1948 by the Bureau of Reclamation. This figure probably would be considerably higher now because of increased prices for farm products and the placement of about 8 million acres of new land under irrigation in the last 10 years.

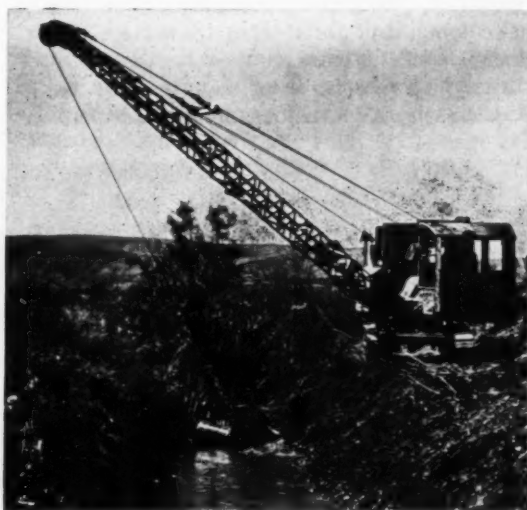
Figures supplied by the U. S. Army Corps of

Engineers show that since 1939 over \$500,000 has been spent on the Potomac and Mohawk-Hudson Rivers in attempts to control waterchestnut. The Corps of Engineers also report that since 1905 over \$5 million has been spent in controlling water-hyacinth in Florida, Alabama, and Louisiana. These figures represent control efforts on relatively small areas, and in spite of these expenditures both waterchestnut and water-hyacinth are still with us.

In Arkansas, Drainage District No. 16 is spending \$5,000 to \$8,000 annually for mechanical control of water-stargrass in about 20 miles of drainage channel. This is \$250 to \$400 per mile for underwater cutting, the method used.

The Central and Southern Florida Flood Control District supported by Federal, State, and county funds, has a network of 500 miles of major drainage canals for which the annual operating costs for aquatic weed control exceed \$50,000. In addition, about \$30,000 was spent annually on aquatic weed control in the smaller drainage and irrigation ditches serving 15,570 square miles of agricultural land in southeastern Florida.

The Los Angeles Department of Water and Power reported the use of 135 tons of copper sulfate during the 1955 season for control of aquatic weeds in potable water supplies at a total cost of \$30,000. Multiplying \$30,000 by



Removing cattail and other weeds from a drainage ditch at a cost of about \$400 per mile.



Mowing of aquatic and bank weeds along canals gives temporary and partially effective control.

the large number of cities in the United States, which have aquatic weed problems in their potable water supplies, would give a sizable figure.

The traditional methods of controlling aquatic and bank weeds include handcutting or pulling, mechanical mowing, chaining, dragging, or crushing. These methods are still in use in many areas and in many situations, but they are slow and the present high labor costs make them very expensive. In most instances the hand and mechanical methods give only partial or temporary control. With these methods the best that can be done is to fight a defensive battle against aquatic and bank weeds.

Research on control of aquatic and bank weeds has lagged considerably behind that on

control of weeds on crop and rangelands, and there is only a moderate research program underway. However, some experimental work on aquatic and bank weeds has been underway for about 10 years and several improved control methods have been developed. Investigations were begun in 1947 and 1948 by the Agricultural Research Service and the Bureau of Reclamation working cooperatively. Some experimental work had been done previously by a few State experiment stations.

The first improved method developed by the cooperative research was the discovery and development of aromatic solvents for the control of submersed aquatic weeds in irrigation channels. The use of these aromatic solvents or methylated hydrocarbons, consisting largely of xylene, has been increasing rapidly in the West since 1952 and totaled approximately 580,000 gallons in 1957. Extrapolations from comparative cost figures compiled by Manager Carroll F. Wilcomb of the North Side Canal Company, Jerome, Idaho, indicate that the use of this improved chemical method throughout the Western States in 1957 resulted in a saving of \$1,084,600 as compared with the cost of controlling submersed aquatic weeds by the previously used mechanical methods. Also, the weed control provided by aromatic solvents was much superior to that by mechanical methods.

Directions for using aromatic solvents for controlling submersed aquatic weeds in irrigation systems are given in U. S. Department of Agriculture Circular 971.

Aromatic solvents in mixture with gasoline and chlorinated benzenes are also being used



Chaining an irrigation canal to remove submersed weeds is a partially effective but temporary treatment. The use of aromatic solvents is replacing this type of mechanical treatment.

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Aromatic solvent, used for killing submersed weeds in an Idaho irrigation canal, forms a milky emulsion as it mixes with the water.

successfully for control of submersed aquatic weeds in water-control canals in Florida. The recommendations for such use are given in Florida Agricultural Experiment Station Circular S-97.

Another improved method developed by the cooperative research of the Agricultural Research Service and the Bureau of Reclamation is the control of cattail by spraying with a low volatile ester of 2,4-D in a 1 to 20 oil-water emulsion (1 gallon of diesel oil to 20 gallons of water); 4 to 6 pounds of 2,4-D in a total volume of 150 to 300 gallons of emulsion is used per acre of cattail. The first spraying should be done just before cattail heads appear; with more treatments as necessary; usually about 3 applications over a 2-year period is required for complete elimination. The Bureau of Reclamation reports that the costs of eliminating cattail by this method range from \$24 to \$43 per mile of canal as compared with \$407 to \$418 for draglining—the most common mechanical method of controlling cattail.

More recently, research has shown that dalapon (2, 2-dichloropropionic acid) and amitrol (3-amino-1,2,4-triazole), alone or in combina-

tion, are effective in controlling cattail. While these herbicides are more expensive than 2,4-D ester in oil-water emulsion, this disadvantage is offset, at least in part, by three distinct advantages: (1) Dalapon and amitrol are effective in low volumes of 5 to 12 gallons of water per acre, hence, may be applied by airplane; whereas, 2,4-D is effective only when applied in high volumes of 150 gallons or more per acre. (2) Use of dalapon and amitrol involves less hazard of spray drift and volatile fumes to nearby sensitive crops. (3) One spray application of these chemicals each growing season usually will give as good control of cattail as 2 repeated applications of 2,4-D in oil-water emulsion.

Copper sulfate has long been used as an algicide. Recent research and experience by the Bureau of Reclamation and the Los Angeles Water and Power Department show that continuous application or frequently repeated applications of copper sulfate for control of algae also controlled or inhibited the growth of rooted submersed species. The chief disadvantage of copper sulfate is that it is toxic to many species of fish at concentrations above 1 part per million. The maximum tolerance limit of fish and



An irrigation canal in Utah with heavy growth of pondweed, anacharis, and algae (above) before treatment, (below) 6 days after treatment with trichlorobenzene.



the minimum concentration necessary for control of algae are too close together for extensive use of copper sulfate in ponds and lakes where fish are desired.

Treatment with sodium arsenite at 4 to 10 ppm of arsenious oxide (As_2O_3) has been widely used for many years to control submersed aquatic weeds in lakes and ponds. Most species of fish will tolerate as much as 11 to 12 ppm of arsenious oxide without injury. Hence, removal of aquatic weeds from ponds and lakes without serious loss of fish is possible. The chief disadvantage of sodium arsenite is its toxicity to human beings and warm-blooded animals and the consequent necessity for extreme care in applying and handling this chemical. Publications giving directions for the use of sodium arsenite for control of aquatic weeds are available and should be closely followed.

In recent years, the research departments of several manufacturers of herbicides have diverted part of their attention to the development and screening of chemicals for aquatic weed control. More than 20 new herbicides now show definite promise for control of aquatic weeds, and many more compounds are being evaluated by commercial and public research agencies.

The development of promising new aquatic herbicides and the increased public awareness of the serious aquatic weed problem in lakes and ponds has resulted in expanded research and action programs for control of these weeds by State departments of conservation. Many State departments have been active in this field. Also many State experiment stations have active experimental programs under way. The Fish and Wildlife Service and the Soil Conservation Service also have extensive action programs and are conducting research on the control of aquatic and bank weeds.

Since 1957, there has been considerable expansion of investigations by the ARS. Existing cooperative research programs in Montana, Washington, and Wyoming were enlarged. New investigations were begun in Arkansas and Florida in cooperation with the State experiment stations and other agencies. The cooperative research program of the ARS and the Bureau of Reclamation at Denver, Colo. was reactivated and enlarged to conduct greenhouse and laboratory evaluations of aquatic herbicides. Also the ARS has made contract research funds available to the Alabama Agricultural Experiment Station for screening of a large number of chemical compounds for effectiveness on aquatic weeds and for tolerance by fish. All aspects of this expanded program are coordinated and integrated with research being done by other agencies to provide an effective total program in developing improved methods of control.

Many problems on control of aquatic and bank weeds remain to be solved. We need more effective and less expensive methods for controlling submersed aquatic weeds in irrigation canals, especially in large canals with capacities above 100 cubic foot per second. We need safer and more lasting methods of controlling algae and other submersed aquatic weeds in ponds and lakes. And we need less expensive and more

effective chemical methods for control of cattail, sedges, rushes, and other rank-growing emergent aquatic and bank weeds.

We have promising leads for solving many

of these problems, and it seems logical to predict that many improved methods of controlling aquatic and bank weeds will be developed by research in the next few years.

The Youngest Board of Supervisors?

By RICHARD S. KEEP

THE Lorain Soil Conservation District in Ohio has a young and enthusiastic board of supervisors.

In fact, until told differently, they are considering themselves the youngest group of district supervisors in the Nation. Their average age is just under 31 years.

The board is composed of: Gordon Hales, age 30, chairman; James Rollin, age 29, vice chairman; Larry Baumann, age 29, secretary; Corwin Burrer, age 30, treasurer; and "the old

gentleman", Kenneth Brill, age 36.

All the members except Larry Baumann have served for two or more years. Jim Rollin succeeded his father, Glen, who had served 6 years as a supervisor. Corwin Burrer is presently serving as an area director of the Ohio Federation of Soil Conservation Districts.

These men have drawn up, and are carrying out, an ambitious plan of soil and water conservation in this district, near Lake Erie, where dairy cattle, vegetable and fruit growing, and industry predominate.

Note:—The author is work unit conservationist, Soil Conservation Service, Elyria, Ohio.



The Lorain Soil Conservation District board of supervisors (seated, left to right) Corwin Burrer, Gordon Hales, and James Rollin, (standing, left to right) Larry Bauman and Kenneth Brill.

Cattle and Mink

A Minnesota Farmer Traps Mink on 25 Neighboring Farms to Supplement the Income From His Cattle Farm.

By A. B. FOSTER

WAYNE HAWKINSON of Pope County probably farms more land than any other man in Minnesota. During the spring and summer he works his own 265 acres growing hay and grain for a 35-cow beef herd. In the fall and early winter he harvests the mink crop on 25 additional farms that total 6,250 acres.

In switching from riding his tractor in the summer to walking his traplines in winter, Wayne qualifies as a really diversified farmer. And he proves the point made by wildlife specialists—that game is actually a crop of the land to be harvested, yet managed and conserved to produce another crop next year and the next.

Just which side of Wayne's business shows

up the best on his income tax return only Wayne can tell. But it doesn't take an auditor to measure the satisfaction he gets from his kind of farming.

Wayne's interest in wildlife is not limited to trapping mink on the streams and marshes of his own and his neighbors' farmlands. Right now he is developing a wildlife area on his own land.

Hawkinson already had a 40-acre lake that averaged 4 feet deep on his farm. Right next to this lake was an abandoned 80 acres that had gone back to the county for taxes. This 80 was flat and grown over with weeds.

"It was too wet for grass and cows and too dry for ducks and muskrats," Wayne said. He had his eye on this abandoned 80 for some time

Note:—The author is information specialist, Soil Conservation Service, Milwaukee, Wis.



Hawkinson inspecting mink traps on a neighboring farm.

with the idea that he could flood it by raising the water level in his own lake, since a small stream flows through the neighboring 80 into his lake. Soil Conservation Service engineers made surveys that showed a dam could be built about a half mile below his present lake that would raise its water level 2 feet and flood a large part of the flat 80.

Wayne bought the 80 acres for \$400 last year. Before he could proceed with the earth dam he had to present his plans to the State conservation department, since he was damming up a permanent stream, which was public water. The division of drainage and water approved his plan and he started the project.

The dam and the spillway cost \$1,440. Hawkenson got some cost-sharing payments through the Agricultural Conservation Program, which helped a lot. The dam consists of an earth fill 275 feet long and 14 feet high, with an 18-inch concrete tube through it and an emergency spillway around one end.

The result is that he now has a 97-acre lake where he previously had 43 acres. The total wildlife area is 139 acres, including the reed-covered marsh. This makes an ideal place for muskrats. Wayne doesn't trap the rats but they are good for the mink to feed on.

This dam serves other purposes besides providing more marsh and water for wildlife. With its 212 acre-feet of flood storage it is serving as a flood prevention project on the small stream. And it will help protect the township road below the dam where in the past high water has backed up against the road fill.

Wayne plans to improve the area even more for mink by building dens, planting grass and meadow borders, and controlling the grazing. He expects to get some return on his investment by doing some trapping and by leasing hunting rights for waterfowl. And, naturally, he is getting a lot of satisfaction from completing the project that he has had in mind for such a long time.

Hawkenson's mink trapping is a partnership deal with the farmers on whose land he traps. He gives the farmer a third or a fourth of his catch depending on the convenience of working the area and other factors.

He starts trapping on the first day of the season and keeps busy, making use of the legal trapping hours from 6 a.m. to 6 p.m. every day



Wayne Hawkenson plowing contour strips on his grain and cattle farm.

during the month long season. He drives an average of 100 miles a day and has to walk from 5 to 8 miles to go in to the traps. He checks them every day, if possible, though sometimes the weather makes this pretty hard to do.

Wayne has been a cooperator with the Pope County Soil Conservation District since 1952. In fact, he was the first man in his neighbor group to complete all the work in his farm conservation plan that includes contour stripcropping on nearly all of the 120 acres of cropland; some diversion terraces, grass waterways and a soil building crop rotation.

Wayne bought the farm 15 years ago and farmed it for 10 years but wasn't satisfied with its production. Since laying out strips, he really feels that the land is doing what it should and he likes it better too. The strips are on the approximate contour and are 100 feet wide.

A 35-cow beef herd consumes most of the hay he grows. He keeps the calves over a year and sells them as 2-year-olds. He finishes them off himself on his own grain and doesn't need to buy any feed.

"This isn't the best farm in the country, I know that," Wayne said philosophically, "but it's an interesting one. You can have your straight grain and hay farms, and I'll take one with a lake, some trees and marsh, and the call of the wild duck."

Soil Maps Sell Farmers

Twelve Illinois Farmers Sign Conservation Agreements After Seeing Map Exhibit Tended by Merit Badge-seeking Girl Scouts.

By ROBERT REPKE

SELLING soil and water conservation with the aid of soil maps is proving to be a profitable venture for SCS technicians and district directors in the McHenry Soil Conservation District in Illinois.

McHenry County is one of the few counties in Illinois that is completely mapped, the survey having been recently finished cooperatively by the Soil Conservation Service and the University of Illinois.

Note:—The author is a conservation aid, Soil Conservation Service, Woodstock, Ill.

When Sam Haning, work unit conservationist at Woodstock, was asked to prepare an exhibit booth for the McHenry County Fair, he and the author decided to invite farmers into a booth where they could see soils maps of their own farms. Through newspaper publicity this was advertised widely. One story was headed: "Come in and see your soils map."

But Sam and I were rather busy, particularly at this time of year. So we looked around for help and got the cooperation of a local group of Girl Scouts guided by Mrs. George McNamara. All 14 of the girls were looking for a way to earn their merit badges in conservation. They were required to do something useful in the promotion and establishment of one or more conservation measures to earn the badge.

Since surveying, laying out, and staking conservation practices in the sloughs, fields, and hills seemed somewhat strenuous for 12-year-old girls, it appeared that they would have difficulty making the grade. But, after the district board approved a motion to provide a conserva-



Stewart Wells, farmer-cooperator, points out the location of his farm on county soil map while Sam Haning of SCS and Jocelyn McNamara, Girl Scout, look on.



SCS technicians explain his soil map to farmer, E. P. Brown (center), at a county fair exhibit.

tion booth at the fair, the girls were ready to earn their badges this way.

Then Mrs. McNamara gained approval from the Council of the Girl Scouts of America for the girls to count this service toward credits on their conservation merit badges.

Shortly afterward, she and her charges met with us to get a general idea of the county conservation picture. The girls had already seen conservation practices under construction and had been told about soil types, land capability and the other working tools and terminology used in soil conservation.

So it developed that Mrs. McNamara and her 14 Girls Scouts helped plan the exhibit, decorate and arrange the booth, and take turns being on hand to help answer questions. One SCS man was on hand at all times.

Showing the farmers the soil maps of their own farms proved rewarding. The entire set of field sheets was on hand, and scores of farmers stopped to study them.

Several farmers asked for the address of the office so that they might learn more at a future date. Twelve farmers signed conservation applications for district assistance during the 4 days of the fair.

Farmers' wives also displayed interest in the soils and the information on practical conservation measures. Occasionally, it was the

wife who steered the "old man" over to this exhibit.

Since the Girl Scout merit badge includes conservation of all natural resources, the girls exhibited examples of other things. They had several tanned fur specimens of beaver, mink, muskrat, and weasel. They mounted pictures of song birds. Being good scouts, they had observed the law as they picked wildflowers to decorate the booth. The girls also showed a variety of conservation bulletins, copies of which they made available to interested persons.

Along with one or the other of the conservationists, Mrs. McNamara and rotating teams of the girls were in the booth during all visiting hours. Their presence didn't hurt the attractiveness of the exhibit, either.

QUACKGRASS CONTROL.—University of Wisconsin agronomists have had good success in killing quackgrass with the chemicals, delapon and 2,3,6 TBA. The chemicals were sprayed on the soil early in the season, at least 3 weeks before crops were planted. The control is effective mainly because these chemicals kill the bud growth on the underground stems of quackgrass. Rain is needed after the chemicals are applied to carry them into the root zone of the grass. Too much rain, however, may leach the chemicals so deep into the soil that control will not be effective.

The Virginians



The SCS has had only three State Conservationists in Virginia in the past 23 years. Here they are: Lyman Carrier (center), Sam Bondurant (right), and the present State Conservationist, Frank Edminster.

A COOPERATIVE EFFORT

By BRICE M. LATHAM

COOPERATION—that's what you will find among agricultural agencies and farmers in Anderson County, S. C.

"Proof of the pudding" can be found on the Don and Richard Quattlebaum farm, located just outside of Pendleton, S. C. Here, all agencies have contributed to the setting up of this practical dairy farm enterprise.

Agencies directly contributing to the planning and installation of the soil- and water-conservation practices and the financing and management of the farm are: Soil Conservation Service, Anderson County Soil Conservation

Note:—The author is area conservationist, Soil Conservation Service, Anderson, S. C.

District, Vocational Agriculture department, county Extension agent, Farmers Home Administration, and the Agricultural Stabilization and Conservation Committee. Each had a part they could and did play on the farm.

Here is how Richard feels about it: "Without the help of these agencies, my brother and I couldn't possibly have accomplished the things we did in such a short period of time.

In August 1956, the Quattlebaums bought their 256-acre farm and went into the dairy business. Don says, "It took all our money to buy the farm. We then called on C. J. Maret, Farmers Home Administration supervisor, to help us buy our original herd of cows, dairy and farm equipment.

"In addition, the FHA made us a soil- and water-conservation loan in 1957."

Through the Anderson County Soil Conservation District, a complete soil- and water-conservation plan was developed. J. T. Brannon,



Don Quattlebaum (center) discusses drainage ditch construction with representatives of agencies that are helping him with his farm improvement program. (Left to right) H. D. Maret, county agent; Joe McGee, ASC Committee; C. J. Maret, FHA supervisor; R. M. Jones, Vo-Ag instructor; T. Ed Garrison, SCD supervisor; and J. T. Brannon, SCS technician.

Soil Conservation Service technician, worked with the FHA and the Quattlebaums in planning for the practices and funds needed.

W. M. Jones, Vocational Agriculture teacher at Pendleton, has been a constant advisor. "From the beginning, Mr. Jones has been a great help to us," says Don. "He has advised us in dairy herd improvement, pasture development, and better farming methods."

The County Agent, H. D. Marett, was right in there pitching too. He advised on the management of the crops and dairy herd. Mr. Marett says, "Our latest recommendation is for them to enroll in the 'Weigh-A-Day-A-Month' record keeping program."

The district soil- and water-conservation plan worked out with the aid of SCS technicians, includes practices on which help was needed from all agencies. It includes clearing 40 acres of fertile bottom land and putting in 30 acres of open drainage ditches. Also included was the establishment of 100 acres of permanent pasture, the construction of terraces, the establishing of waterways on the cultivated land, the building of a farm pond, and the designing of an irrigation system.

The ASC helped a lot by cost-sharing in many of the practices. This included assistance in

establishing 40 acres to fescue and clover, fertilizing 32 acres of permanent pasture, installing 2,086 feet of drainage ditches, and the construction of the irrigation pond.

Some steep eroded land has been reconditioned, old bench terraces have been torn down, old fruit trees removed, and sericea planted for hay and grazing on these areas. Alfalfa has been established on 13 acres of good land, and 15 more acres were seeded in the fall of 1958.

Even though time has not permitted the complete plan being established, the Quattlebaums have increased their milk cows from 32 to 50. In addition, they have 40 heifers and calves. They grow all the feed for the herd on the farm.

Besides being progressive and industrious farmers, the Quattlebaums are active in community activities. Both Don and Richard attended Clemson Agricultural College. Don is a member of the Exchange Club and Pendleton Farmers Society, and Chairman of the Three and Twenty Watershed advisory committee. Richard is currently missed on the farm—he is serving his obligation in the Armed Forces.

One of the Quattlebaums' secrets of success, thus far, is their ability to recognize when they need help and to call upon those in the various agencies to get the assistance needed.

A Wildlife Haven

South Dakota Farmers Create a Wildlife Haven by Using Soil- and Water-Conservation Practices.

By LLOYD P. DUERRE

THE proof that abundant wildlife will result from soil- and water-conservation practices on the land can be found on the Martin and Kenneth Nielson farm, 5 miles southeast of Woonsocket, S. Dak.

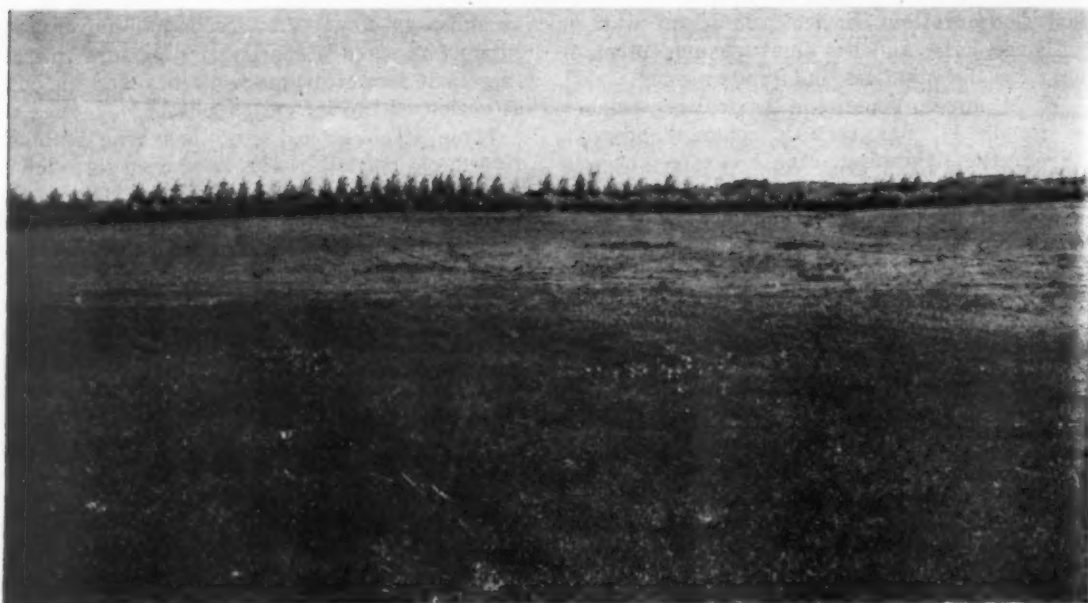
Martin Nielson started farming here in 1919 on 240 acres. Now he and his son, Kenneth, own and operate 1,200 acres. Their farm is located in an area of light, sandy soils, where wind erosion always has been a problem and reached serious proportions during the 1930's.

Martin became a cooperator with the Silver Creek (now Sanborn County) Soil Conservation District soon after it was organized in 1939. Previously he had been active in the Silver Creek Voluntary Soil Conservation Association, an organization of farmers who got together in 1934 to combat the wind erosion problem.

He has developed and carried out a complete soil- and water-conservation plan on all his land with the assistance of the soil conservation district and Soil Conservation Service technicians.

Martin says, "Wind erosion always has been

Note:—The author is work unit conservationist, Soil Conservation Service, Woonsocket, S. Dak.



Wildlife planting of trees and shrubs bordering a pasture on the Nielson farm.

and always will be our biggest conservation problem. We have prevented our land from suffering any real serious damage recently, but all of us here had trouble during the 1930's." The Nielsons have acquired much of their land since that time and some of it had suffered damage.

Martin says, "Our biggest problem being wind erosion, we started our conservation program by planting trees and grass. Now we have more than 50 acres of field and farmstead windbreaks. Our first 7-acre field shelterbelt was planted in 1936 in cooperation with the Prairie States Forestry Project. At that same time we planted a farmstead windbreak on the home place. Then in 1940 we planted a 10-acre belt on the land where Kenneth now lives and planted 2 acres to protect the Cuthbert school and church. In 1955, we planted 7 acres of wildlife cover in cooperation with the South Dakota Department of Game, Fish, and Parks.

"We plant some trees nearly every year and plan to plant at least one more field shelterbelt in the near future. You can't place a value on trees, it is just in the nature of things to have them. The 1930's proved that we need them to control wind erosion. In addition to their value in controlling wind erosion we wouldn't feel at home without trees.

"Another good thing about having lots of trees is the benefit that they provide for all kinds of wildlife. We have more birds of all kinds around now than when I first came here. In addition to providing homes for songbirds, trees make good pheasant cover and a place for deer and rabbits."

Martin and Kenneth hunt and fish as their main recreation, so having plenty of wildlife around is one of their objectives in planting trees and other wildlife cover. In addition to planting trees, they have developed two other wildlife areas. These are dugouts in sloughs conveniently located near the tree plantings. One of these dugouts was developed exclusively as a permanent waterhole for wildlife. It is located near 10 acres of old trees with a wildlife cover planting 120 rods south of the dugout. The area around the dugout has been seeded to brome, alfalfa, and sweetclover, which is not mowed or grazed.

Martin says, "Now the pheasants, ducks, deer, birds, and all other kinds of wildlife have a permanent waterhole even in dry seasons. With plenty of cover and feed close by, hunting is really good in and around this area. I plan to put another dugout in the same area to hold some more water and make it even better."

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The Nielsons put in one of the first stock water dugouts in the district in 1949 and this was enlarged in 1950. Although this area is in pasture, grazing is well-managed so a good cover remains. In addition, Russian olive, cottonwood, and willow trees have been planted. These have done very well and are providing good cover.

The third dugout was constructed in 1955 in a slough area in former cropland that was seeded back to permanent grass. It is surrounded by willow thickets and cottonwood trees. Grazing is controlled to leave a good grass cover. These dugouts also serve as stock watering places.

The Nielsons now cultivate only one-half of their 1,200 acres, using tame grass and legumes in a planned conservation crop rotation on it. They plan to seed more cropland to permanent grass and concentrate on raising livestock.

The cultivated land, in addition to having a good rotation, is protected by splitting the fields into strips, keeping a crop residue cover on the fields, rough tillage, and no fall plowing. These practices have done an effective job of controlling wind erosion.

Martin and Kenneth completed their conservation story by stating, "Our farm is well-balanced and is getting so we can handle it without fear of wind erosion. You have to learn how to handle this light, sandy land and, of course, our shelterbelts are now up to where they really cut down the wind. Raising livestock has been the answer to farming in this area for us, because when this land is in grass, it can't blow.

"We have plenty of good pasture and hay to take care of all the livestock we can handle. Crop yields are up to what they were when this land was first farmed. In some cases, yields are even better due to good soil fertility and better varieties of corn and small grain."

A DIFFERENT SANTA CLAUS

A Soil Scientist's Hobby Is Telling the Real Meaning of Christmas in The Guise of Santa Claus.

By ROBERT L. WILLISIE
and RUTH A. FRIES

A hobby—a desire—a Santa Claus suit: These have been used by Robert Finley, SCS soil scientist, of Jamestown, N. Y., to tell thousands of children, for the past 25 Christmas seasons, the real meaning of the day. He takes annual leave from his Government job to play Santa.

He sets up shop in a commercial department store in Jamestown to tell the real, non-commercial story every Christmas. This has attracted some skeptical parents and ministers to find out if what they have heard about this unusual Santa is true. They come, learn, are convinced, and come back for more the next year.

Note:—The authors are work unit conservationist, Soil Conservation Service, Jamestown, N. Y., and assistant to the editor, SOIL CONSERVATION Magazine, Washington, D.C.



Robert Finley donning his working clothes for the Christmas season.

THE SMALL WATERSHED PROGRAM is a great step forward in our national efforts to conserve our soil, water, range, timber, and wildlife resources. This is because the small watershed approach recognizes that soil management and water management are inseparable.

EZRA TAFT BENSON,
Secretary of Agriculture

Those most important non-skeptics—the children—seem pleased with this “different” Santa, even though they are not patted on the head, are not told that they will get all the presents they ask for, nor that if they’re good ’til Christmas, those asked-for presents are a sure thing.

Instead, they are first asked if they know the real meaning of Christmas, whose birthday it is they are celebrating, and why presents are exchanged. If these questions stump them, they are told the Christmas story. Now, more than 90 percent of the children know the story, much to Santa’s satisfaction.

Bob Finley is visited by 8,000 to 10,000 children during the Christmas season. Some families travel as far as 150 miles to see him, and they are willing to wait hours in line so that their children may share in this rich experience.



Santa tells the Christmas story to one of his customers.

Mr. Finley’s regular job, outside the Christmas season, is to make soil surveys of three New York counties. Currently he is working on the soil survey in Chautauqua County, N. Y.

He is a man of many talents, most important, he feels, being his ability to get along with children. He said he loves to talk with them and find out what they are thinking.

Finley did not start his Santa Claus career in Jamestown. Previously, he played the role

in Safford, Ariz., Ramey, W. Va., Vincennes, Ind., and Little Valley, N. Y. At all these places he was enthusiastically received, especially by those whom he thinks count most—the children.

DISTRICT PROFILE

OSCAR AND
BERNICE CAMP
of
WASHINGTON

FORTY-FIVE years ago Bernice Bowers, fresh out of Ellensburg Washington Normal School, married Oscar Camp, a farm boy she met at church in Walla Walla, Wash. Together they rented a place of their own and started farming in 1913 near Walla Walla.

Oscar soon recognized that if he was going to continue in business and raise his family as he had planned, it would be necessary to control erosion and conserve the water that ran off his land. Many farmers then followed the practice of burning the stubble each spring before plowing. This may have simplified the plowing operations, but Oscar was convinced that it added to the erosion problem. He soon learned that by disking his stubble and discarding his moldboard plow he could conserve moisture and produce a better crop. He also learned early that land seeded to crested wheatgrass paid dividends in the long run.

In 1929, Oscar and Bernice purchased a 2,000-acre farm near La Crosse, in Whitman County, Wash. Things were not as rosy as they might have been for a few years thereafter. In 1932, as we all know, the bottom dropped out of the wheat price. During this period, Oscar started farming with a tractor, and because of financial conditions and shortage of help, he was forced to do much of his plowing at night.

Oscar bought a gentle cow with the thought that perhaps Mrs. Camp would be able to help him with the chores. But he soon learned it was useless to try to teach a city girl to milk. Then the cow contracted milk fever and died. After that, Oscar decided it would be cheaper for him to take care of the cows. However, Mrs. Camp learned about poultry and took full charge of a flock and also the garden.

Oscar recalls one of the most trying periods of their married life was after their house burned down in 1919. For the next 6 months, after the fire, they lived in a tent. Mrs. Camp recalls that she had to hold an umbrella over the baby to keep the rain from dripping through the canvas onto his crib, and that she had her feet frostbitten because of the below zero weather. Several neighbors suggested that she "go home to mother", but she remained with Oscar. Finally, on December 2, with the weather 11 degrees below zero, they moved into their new home.

Mr. and Mrs. Camp have done such a good job of teaching conservation farming to their children that one of their sons was named "Mr. Conservation Farmer of the Soil Conservation Districts" by the Washington Junior Chamber of Commerce in 1957.

Conservation farming has become second nature to Oscar. When the soil conservation district was organized in 1947, he assumed that every farmer in the area would ask for technical help. He knew every farm in the district needed a well-planned conservation program. To his surprise, however, very few farmers took advantage of the technical help and facilities offered. Yet, his enthusiasm for the self-government idea remained undiminished and his impatience was directed only toward those he felt

were "dragging their feet" and serving as "wet blankets" to the district concepts and ideas.

Oscar became a supervisor of the West Whitman Soil Conservation District in 1948 to serve the unexpired term of an elected supervisor who moved away. It was at that time that Oscar and Bernice really caught the conservation fever, from which they have not yet recovered. They started attending soil conservation district association meetings in 1949 and have not missed a State convention since that time. In addition, they have gone to every Pacific area convention since 1951 and every national convention since 1952, as well as countless other out-of-State conservation meetings.

Oscar resigned as president of his area association in 1952 to become vice president of the Washington State Association of Soil Conservation Districts, serving as its president from 1954-56. A certificate of tenure was awarded him in 1954 for his conservation activities by the Washington State Soil Conservation Committee. He has served 3 years as a member of the Washington State College of Agronomy Advisory Board, is a member of the Washington State Soil Conservation Committee, has served several years on a committee to advise the State Agricultural Stabilization Committee on ACP matters, as well as being a member of the Columbia Interstate Compact Commission in 1954. He also belongs to several civic organizations in and around Spokane.

In the meantime, Mrs. Camp has not just been tagging along. She accompanies her husband to many of the meetings and takes an active part in those she attends. She has served 4 years as secretary of the State Association Auxiliary, as well as being vice president of the ladies auxiliary of the National Association of Soil Conservation Districts for 3 years.

In 1957, in recognition of their devoted service to conservation, the Washington State Association awarded to Mr. and Mrs. Camp its Special Service Award. Ordinarily this award goes to one person, but because the award was earned by a genuine "spirit of togetherness", the 1957 award was given to both Mr. and Mrs. Camp for their outstanding work in conservation.

The Camps feel that the glory in a soil- and water-conservation program is great, and there is plenty to go around, but it is up to each dis-



Oscar and Bernice Camp receive the special service award from the State of Washington, 1957.

trict supervisor to get the job done. He says, "We are the boys who must direct the program in our districts to see that farmers stop losing their topsoil through wind and water erosion."

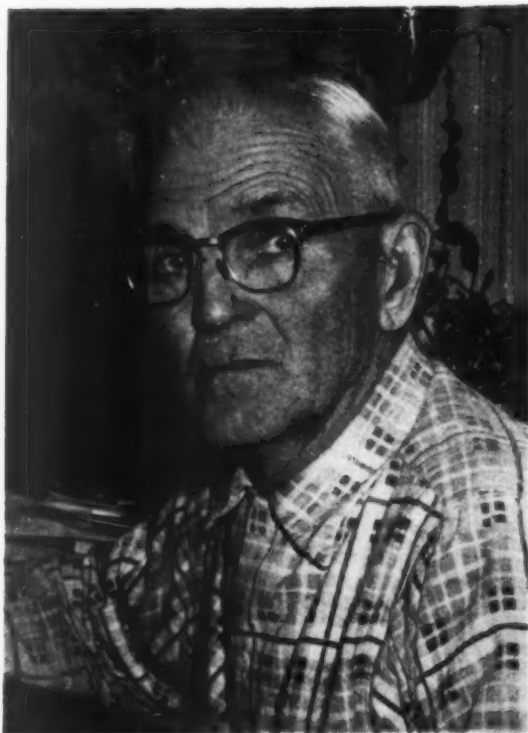
—H. C. FLETCHER

DISTRICT PROFILE

FRED H. TOTTEN
of
NEW JERSEY

FRED TOTTEN farms 144 acres, near Ringoes, in New Jersey's Hunterdon County, growing corn, oats, wheat, and hay to feed his dairy herd of 45 Holsteins and a flock of 900 White Leghorn layers. Every Saturday morning, for years, he has supplied a fresh-egg route in Trenton, 22 miles away. Thus, just about everyone in the area knows Fred.

He is the "Pappy" of the soil conservation movement in New Jersey. Fred's farm has



Fred H. Totten

slopes as steep as 25 percent. Soil and water losses used to be heavy. When the Neshanic River Watershed project was set up in 1935, Fred was the first to apply for assistance. Almost overnight, his farm became an outstanding example of modern conservation practices. His was the first modern terrace system ever installed in New Jersey. From the beginning, he preached and practiced conservation farming.

In 1942, the landowners of Hunterdon County voted to form a soil conservation district and Fred was chosen supervisor. Five years later, Hunterdon County combined with Somerset and Union Counties to form the Mid-Jersey Soil Conservation District. Fred remained a supervisor and was named district chairman. He has held that office continuously to this day.

He also helped organize the Ringoes Grange, and the National Farm Loan Association of which he has been president for over 30 years. He has been a member of the East Amwell Township school board for over a decade. He has been a member of the executive committee of the Hunterdon County Board of Agriculture for 28 years. He is an Elder of the Presbyterian Church of Larisons Corners. He has served in the Dairyman's League for over 30 years.

"In all community activities," Fred says, "I've found there's inevitably an active role for soil and water conservation."

—HOWARD MASON

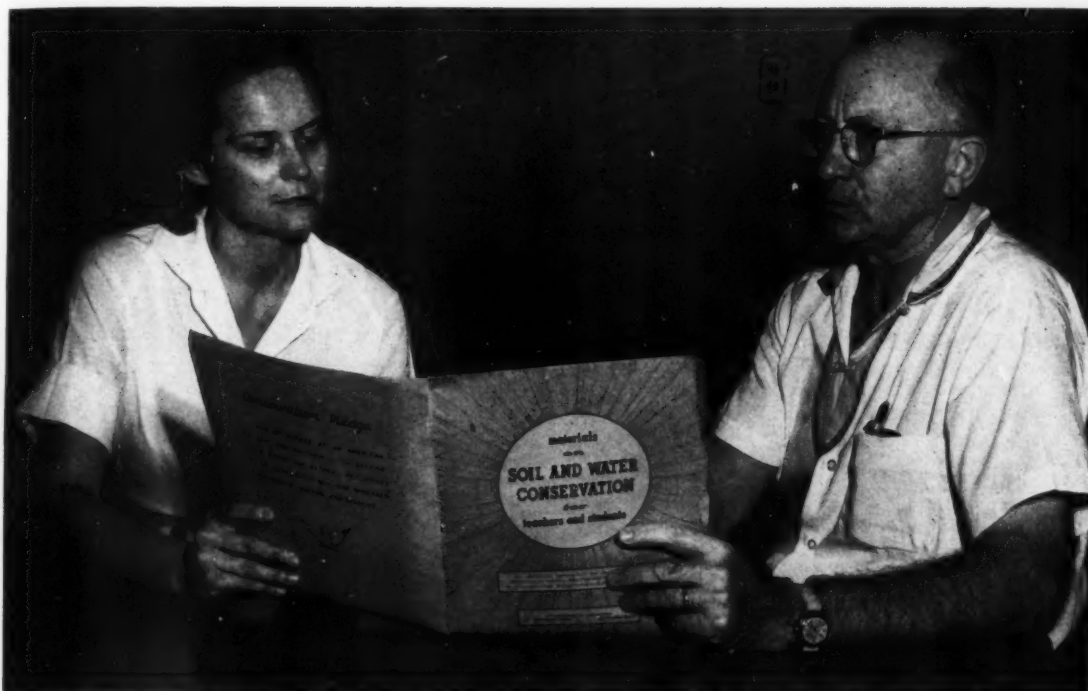
Every Teacher a Conservationist

The Director of the Conservation Workshop at the University of South Carolina Tries to Make a Conservation Missionary of Every Teacher Who Attends.

By J. B. EARLE

FOR the past 6 years the University of South Carolina has conducted an annual conservation workshop for teachers. Numerous agencies have contributed speakers and materials.

Note:—The author is assistant State conservationist, Soil Conservation Service, Columbia, S. C.



G. R. Graham (right) and Mrs. Verna Bozardt, teacher, look at a packet of reference material used in the conservation workshop at the University of South Carolina.

Teachers participating have written excellent term papers explaining the ways in which they plan to incorporate the conservation idea into their regular classes.

G. R. Graham of the university faculty is in charge of the workshop each year. He stresses two reasons for teaching conservation of our natural resources. The first is the "explosive" increase in human population. The second is the changes in cultural patterns resulting from industrialization.

"How to produce, build, and grow without destroying the basis of future existence seems to be at the heart of the meaning of conservation today," he said. He points out that we should not only be concerned with survival but with a more abundant life. "Unwise use by all will lessen man's chances for survival and promptly reduce his opportunities for the good life on earth. Attitudes toward nature—flowers, birds, insects, plants, soil, water, the beauty of them, the relationships between them, our dependence upon them—attitudes that develop early in life and are modified year by year—

these attitudes can save us or they can destroy us," he stated.

This is the challenge Mr. Graham gives the teachers attending these workshops. "An enlightened citizenry is doubtless more necessary now than at any time in the past. The frontier called for hardiness but it supplied all comers with plenty—just for the taking. We can no longer just take; we must plan and provide not only for ourselves but for future generations."

Teachers go away from these workshops agreed that conservation should not be taught as a separate subject. It should be integrated with all of the usual subjects. It should be taught by every teacher, in every grade, and in every subject from first grade through high school.

"Perhaps we might say that conservation is a way of life or a philosophy of life that should flavor all our school work," Mr. Graham said.

All of this argues for more teaching of conservation of natural resources in both our rural and our urban schools. These schools not only have a responsibility to the individual child but

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to society as well.

Perhaps the most valuable information gained in the conservation workshops is the acquaintance that teachers make with soil conservation district supervisors, farmers cooperating with soil conservation districts, and resource people in their communities. They meet the representatives of agricultural agencies and learn the part each plays in resource conservation.

The goal of these workshops is: "Every teacher a conservationist." Through the child the teacher may contact not only parents but many other individuals in the community. Most of these teachers become missionaries for conservation in their communities.



LAND: The Yearbook of Agriculture. 605 pp. Illustrated. 1958. Washington, D. C.: U. S. Government Printing Office. \$2.25.

THE new 1958 yearbook of agriculture is a fitting companion to last year's volume, **SOIL**. By considering land from the standpoint of economics, it leads us to think of problems and policies in the use of the physical resources described in the 1957 Yearbook.

The sections titled "Our Heritage of Land", "How We Use and Manage Public Lands", and "How We Use Our Private Lands" present a history and inventory of our land resources.

"Some Financial Aspects of Land Use" and "Rights, Ownership, and Tenure" cover the economics of land use.

Soil and water conservation, watershed protection, and related subjects are treated in "Taking Care of What We Have."

"Our Woods and Temple Hills" deals with forest land and timber resources.

"These Also Are our Country" describes the land resources and problems of Alaska, Hawaii, and Puerto Rico.

"Our Growing Needs and Problems" and "Planning for Better Use" consider production trends, prospective future needs, advances in technology, and such special problems as transportation and urbanization. Here is significant recognition of soil and water conservation as a part of the improving technology upon which we must depend to meet the soaring needs of our growing population.

The authors, as usual with recent yearbooks, comprise an impressive roll of authorities on the subject. Many of them are from outside the Department of Agriculture.

Two highlights of the book are groups of photographs. One, "Forever the Land" sketches the history of the development of our country, ending on the optimistic notes of education and conservation. The other, "The Face of Our Land Looks to the Sky" shows typical land patterns by means of aerial photographs.

The style and appearance of the book immediately stamp it as a sequel to **SOIL**.

—BEN OSBORN

EVAPORATION LOSS.—The U. S. Geological Survey estimates that 21 million acre-feet of water is lost through evaporation from surface waters of the 17 western States each year.